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ATTACHMENT G: CONSTRUCTION DETAILS

Facility name: Archer Daniels Midland, CCS#1 Well
IL-115-6A-0002

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Well location: Decatur, Macon County, IL;
39° 52' 36.9402" N, 88 ° 53' 35.721" W

This document provides details of the construction of CCS#1 and describes the pre-injection logs and tests performed prior to commencement of injection at the well.

Open hole diameters and intervals

Name	Depth Interval (feet)	Open Hole Diameter	Comment
Surface	0-355	26	To bedrock
Intermediate	355-5,339	17 ½	To primary seal
Long	5,339-7,236	12 ¼	To Total Depth

Casing Specifications

Name	Depth Interval (feet)	Outside Diameter (inches)	Inside Diameter (inches)	Weight (lb/ft)	Grade (API)	Design Coupling (Short or Long Threaded)	Thermal Conductivity @ 77 °F (BTU/ft.hr.°F)
Surface[1]	0-355	20	19.124	94	H40	Short	29
Intermediate[2]	0-5,339	13 3/8	12.515	54.5/68	J55	Buttress	29
Long[3] (carbon)	0- 5,272	9 5/8	8.835	40.0	N80	Long	31
Long[3] (chrome)	5,272 - 7,219	9 5/8	8.681	47.0	Chrome all	JFE Bear	13

Note 1: Surface casing is 355 ft of 20 inch casing. After drilling a 26" hole to approximately 355' into the bedrock below the shallow groundwater, 20", 94 ppf, H40, short thread and coupling (STC) casing were set and cemented to surface. Coupling outside diameter is ~21 inches.

Note 2: Intermediate casing: 5,339 ft of 13 3/8 inch casing. After a shoe test or formation integrity test (FIT) was performed, a 17 1/2" hole was drilled to 5339' into the Eau Claire, the primary seal to the Mt. Simon. 13-3/8", 54.5 and 68 ppf, J55, long thread and coupling (LTC) and buttress thread and coupling (BTC) were cemented to surface. Coupling outside diameter is ~14 3/8 inches.

Note 3: Long string casing: 0-5,272 ft of 9 ⅝ inch, N80 casing; 5272' - 7219' of 9 ⅝ inch, chrome alloy (e.g., 13Cr80). After a shoe test was performed and the integrity of the casing was tested, a 12 ¼" hole was drilled to approximately 7219' through the Mt. Simon, where the long string casing was run and specially cemented. Coupling outside diameter is 10 ⅝ inches for N-80 and 10.485 inches for the chrome alloy (e.g., 13Cr80).

Tubing Specifications

Name	Depth Interval (feet)	Outside Diameter (inches)	Inside Diameter (inches)	Weight (lb/ft)	Grade (API)	Design Coupling (Short or Long Thread)	Burst strength (psi)	Collapse strength (psi)
Injection tubing[1,2,3]	0-6,363	4 ½	3.963	12.6	Chrome alloy	JFE BEAR	8,960	7,820

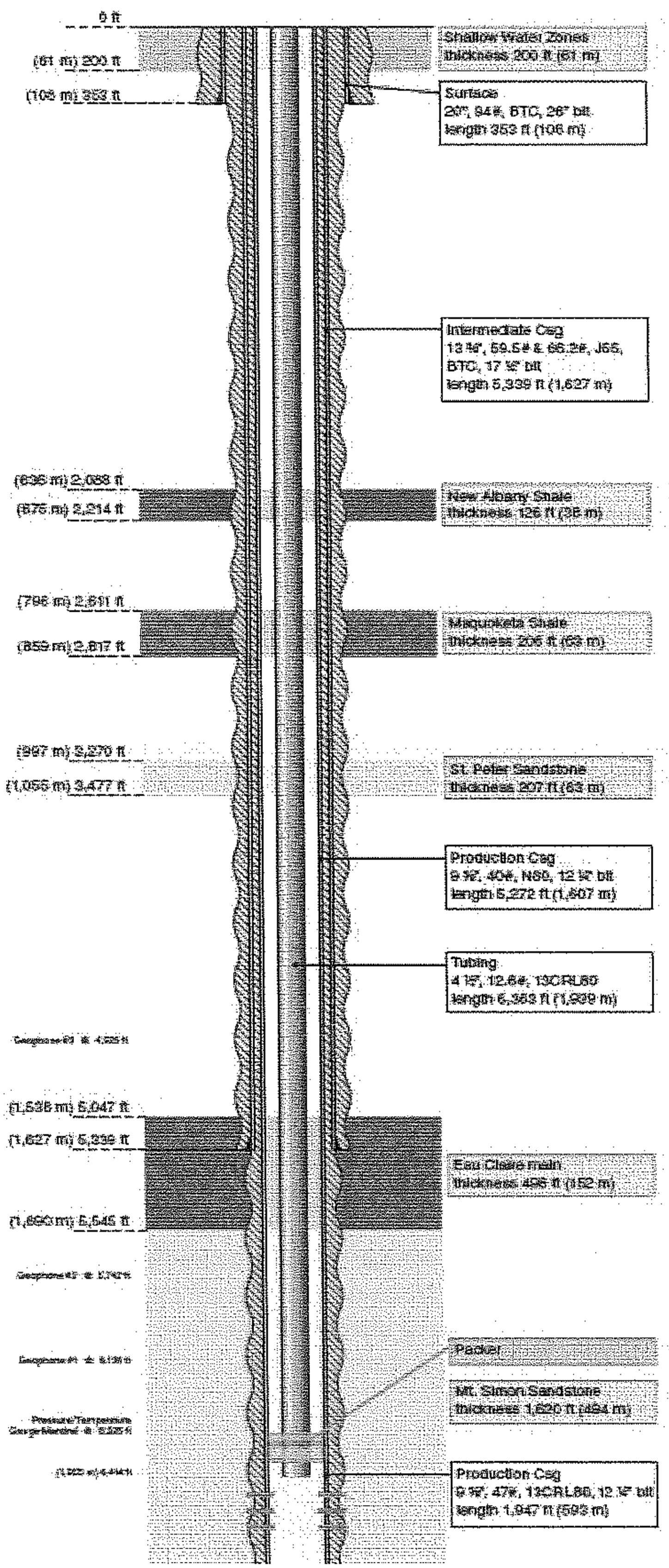
Note 1: Maximum allowable suspended weight based on joint strength of injection tubing. Specified yield strength (weakest point) on tubular and connection is 306,000 lbs.

Note 2: Weight of injection tubing string (axial load) in air (dead weight) is 79,539 lbs.

Note 3: Thermal conductivity of tubing @ 77°F is 13 BTU / ft.hr.°F.

The injection well was plugged back from the bottom with at least 80 feet of cement or a greater amount sufficient to prevent the injection fluid from coming in contact with the Precambrian granite basement. The figure below is a well construction schematic for CCS#1.

Injection Well Schematic



Pre-Injection Testing

Deviation Checks

The subsurface and surface design (casing, cement, and wellhead designs) exceeds minimum requirements to sustain the integrity of the caprock to ensure that the CO_2 remains in the Mt. Simon. The final well design met requirements in terms of strength and CO_2 compatibility.

The wellbore trajectory of each of the deep wells for the Illinois Basin-Decatur Project (injection, verification, and geophysical wells) was tracked. The wells were drilled to an inclination standard that eliminated the risk of interception with adjacent wellbores and surveyed at least every 1,000 feet of depth to ensure compliance. Wells were held to less than 5 degree inclination.

Tests and Logs

The following testing and logging was performed.

During Drilling

Each open hole section (prior to setting each casing string) was logged with multiple suites to fully characterize the geologic formations (reservoirs and seals). Wireline resistivity, elemental capture spectroscopy, spontaneous potential (SP), gamma ray (GR), photoelectric factor and bulk density, and caliper logs were run. Sonic and compensated neutron porosity logs were also included on the intermediate and TD run. The TD run also included magnetic resonance, micro-imaging (dipmeter and fracture ID), formation pressure and rotary cores.

For the injection well, 90 feet of whole core were obtained for the Eau Claire and the Mt. Simon. 12 sidewall cores were taken in the Eau Claire formation and 1 sidewall core was taken in the granite formation below the Mt. Simon.

A Cement Bond Log (CBL) with radial capability and/or Ultrasonic Cement Imaging logs was run on all casings strings with a possible exception for the surface casing. Due to the large surface casing size, a cement bond log with radial imaging was not possible; however, a conventional CBL and temperature log was run. The cement bond logs showed some isolated areas with channels or microannuli, however, they did not appear to be continuous or to compromise zonal isolation. The successful circulation of cement to the surface indicates an intact cement sheath.

During and After Casing Installation

A baseline reservoir saturation tool (RST) and temperature log were run; these will be compared with multiple passes during and after injection for detailed knowledge of where the CO_2 has moved vertically. Careful monitoring of the top of the Mt. Simon Sandstone formation, as well as the porous zones above the seal, was used to confirm the integrity of the completion.

Ultrasonic Cement Imaging logs with radial capability were run on the intermediate and long string casings. Ultrasonic Imaging logs provided casing thickness and internal radius baseline measurements in addition to cement evaluation data. Casing internal diameters were baselined by running a multi-finger caliper (MFC) log in the long string casing prior to the well completion.

Based on previous analysis and results in the area, stimulation via hydraulic fracturing of the injection zone was not required. The perforations were acidized using 15 percent hydrochloric acid to reduce formation damage caused by drilling. An underbalanced perforating technique, either static or dynamic in nature was utilized.

After the well was cased, three pressure fall-off tests were performed to provide data for the reservoir modeling. Since injectivity testing is best analyzed in a single-phase fluid environment, the gauges were placed near a perforated interval, and then fluid was injected for a period and the pressure fall-off was measured. A total of three pressure fall-off tests were conducted. The first involved injection for 2 hours and monitoring for 19.5 hours; the second involved injection for 5 hours and monitoring for 45 hours; the last test involved injection for 13 hours and monitoring for 105 hours. Also at this time, a step rate test was performed to determine the fracture gradient. The well was perforated between 6,976-6,978 and 6,982-7,050 feet.

Demonstration of Mechanical Integrity

Cement and system mechanical integrity were verified after construction with cement imaging logs with a radial capability (UltraSonic Imaging Tool, USIT). Furthermore, mechanical integrity was confirmed by pressure testing the casing (750 psig) prior to perforating, and after the packer was installed, the tubing/casing annulus was pressure tested. All tests were recorded. The pressure drop during the pressure test was 5 psi over an hour, resulting in a passed test. As mentioned above, a baseline reservoir saturation tool (RST) log was run. Repeat RST logs can be run if anomalous temperature data indicates a need for further analysis. Careful monitoring with temperature data across the top of the Mt. Simon Sandstone formation, as well as the porous zones above the seal, were used (along with data from the verification well) to confirm the integrity of the completion.

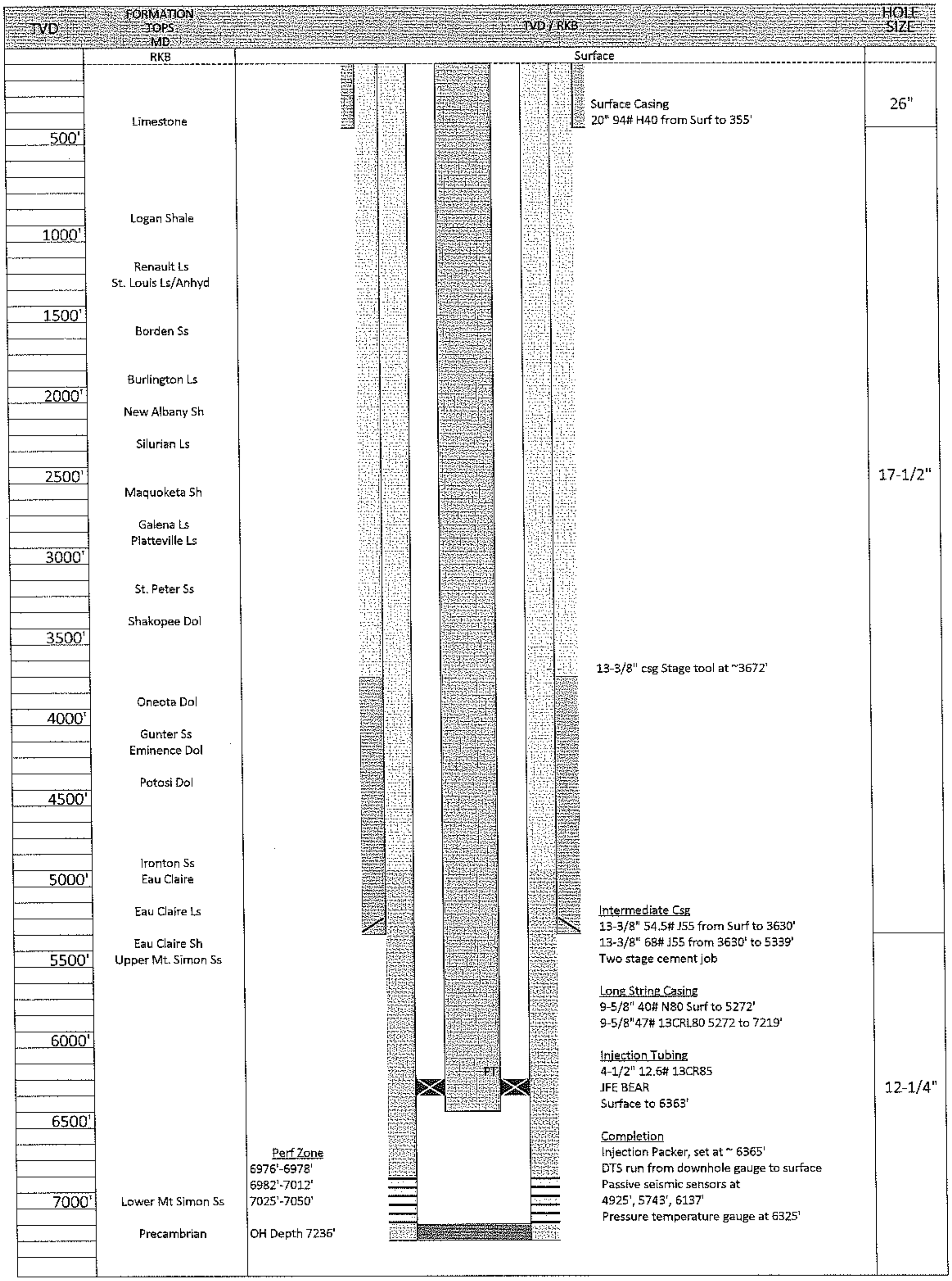
Below is a Summary of the MITs and pressure fall-off tests that were performed:

Requirement	Test Description	Program Period
MIT - Internal	Annulus Pressure Test	Prior to Operation
MIT - External	Temperature Log	Prior to Operation
Testing prior to operating	Pressure Fall-off Test	Prior to Operation

IBDP CCS#1 Well Schematic

(depths are reference to the Kelley bushing = 689 ft above MSL)

KB = 15 ft above ground, site elevation = 674 ft above MSL



All casings are cemented to surface

CO_2 resistant EverCRETE* was used for tail cement on long string job